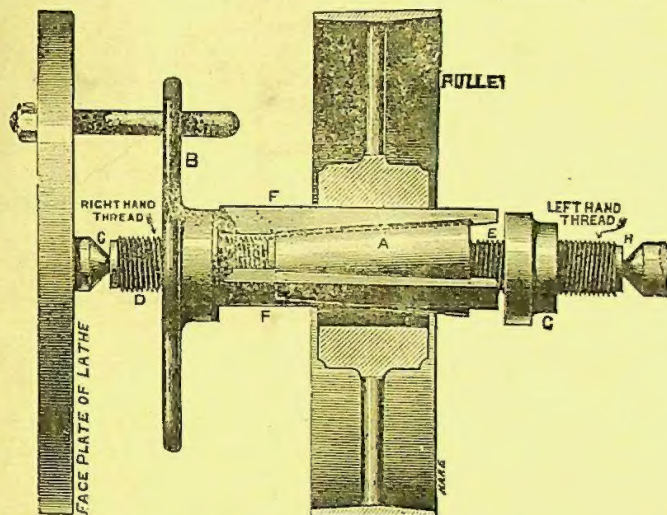


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### Noble's Expansive Mandrel.

This mandrel, which has been brought out by the Britannia Company, of Colchester, deserves the attention of engineers and all users of lathes. The mandrel which is shown in our engraving is made of steel, with three grooves, into which three steel slides, F, fit. It has a right hand thread at B, and left hand thread at opposite end. The tightening nut B is also the driver, and as the tool comes into contact with its work it moves the driving nut and the three steel slides up the mandrel, thus expanding exactly sufficiently to hold the article firmly. The following advantages are claimed for



the appliance:—Any article such as pulleys, bushes, &c., can be fitted by it in a moment, without fixing in a vice or hammering; the slides expand automatically, the deeper the cut of the tool the tighter the mandrel holds, as the driver is also the tightening nut; they always expand parallel to centres, thus assuring true work, which cannot be done on the old style of mandrels, which are slightly tapering; the economy of time effected by the use of these mandrels will in a few weeks repay their cost; each mandrel expands from  $\frac{1}{4}$  to  $\frac{3}{4}$  in. according to size, and extra slides can be supplied at a small extra cost to expand double or treble the sizes given; the extra slides provide for intermediate sizes; by unscrewing the nut C (by means of the spanner) the tightening nut B will unscrew at the same time, one having a left and the other a right hand thread. *Invention 11/13/86—2209.*



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